possédais dans mes semis que des plantes à fleurs rouges ; j'avais en triant les sujets pour la reproduction toujours écarté les fleurs les moins brillantes. Il s'agissait maintenant d'obtenir des fleurs à couleurs pâles. Des efforts nouveaux furent fait dans cette voie ; je vis au bout de deux ans après apparaître la première fleur aux pétales blancs et à onglet rouge ; dès lors les croisements se multiplièrent au point qu'après la neuvième année la perfection des formes et des coloris est telle que tous ceux qui voient mes Cyclamen Papilio sont unanimes à reconnaître leur mérite et leur perfection des fleurs."

In this case the basis of the new strain was found in a marked variation or "sport." The deviation from the type could not, however, have been very marked. The most remarkable feature in "Papilio" as now developed is the curled and toothed margin of the corolla segments. These peculiarities repeat characters which occur elsewhere in the order. In *Soldanella* the toothing is conspicuous : curling occurs in cultivated varieties of *Primula sinensis*. It is interesting to observe in "Papilio" that in the primary variation there was a correlation between the toothing of the corolla segments and of the leaves.

Cresting.

The most remarkable form which has made its appearance under cultivation is that in which a plumose crest has developed on the inner surface of each corolla segment. This is shown in Fig. 10, which represents the "Bush Hill Pioneer," raised by Messrs. Hugh Low and Co. I quote the account of its development with which they have been so good as to furnish me :—

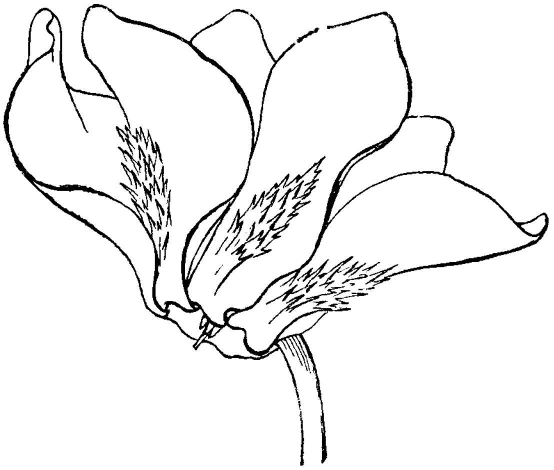

FIG. 10.

"This interesting variety was first observed in our nurseries some four years since, but how it originated we are unable to say.

"At that time, the only peculiarity about the variety was a *very slightly raised rib* running part of the way up the petals, and showing *no tendency to branch*. This was, however, considered sufficiently curious to follow up, and we seeded it with its own pollen.

"The young plants from this *showed a decided improvement*, the rib in some cases *showing a marked tendency to branch*. The best varieties (ten in number) were again fertilised with their own pollen, and the plants now being exhibited by us have resulted, although, needless to say, they are among the finest obtained up to the present, though *all* show a further improvement, *every flower* having a well-branched feather on the petals.

"We have this year found some colour in one plant, and we believe we shall have no trouble in obtaining crested flowers in a variety of colours."

The corolla segments of *Cyclamen* have no mid-rib. The appearance of such a structure is a reversion to the original leaf-type. The development of a crest from a mid-rib carries reversion very far back indeed. The branching of a leaf-structure in the plane in which it is expanded is common enough ; branching in a plane at right angles to this is rare.

Leafy outgrowths frequently occur from the mid rib in the cabbage (Masters' "Teratology," p. 455). In this case the structure of the leaf approximates to that of a stem, of which, indeed, the leaf may be regarded as a modification.

An interesting fact with regard to this singular variation is that it has appeared more than once, and independently. It first occurred in 1885, but seems afterwards to have been lost sight of (*Gardener's Chronicle*, 1885, p. 536). It has also occurred in a red-flowered form in France (*Revue Horticole*, 1897, pp. 98 and 130), in which case it was also perpetuated by seed.

I have not succeeded in discovering any similar structure in any primulaceous plant occurring in a wild state. Dr. Masters, however, informs me that it has been observed in cultivated forms of *Primula sinensis*. The tendency thus seems to be latent in the order, though why it should be so I am unable to explain.

Some theoretical interest appears to me to attach to the rapid development of so striking an ornament of a corolla segment. Such appendages are frequent enough in orchids, and are regarded as adaptations to cross-fertilisation by insects. Their gradual evolution might be thought to require a long period of time ; but in the present case we have definite evidence that such a structure may be developed by selection with great rapidity.

Conclusion.

(1) The facts which I have stated appear to me to establish the result that, when once specific stability[1] has been broken down in a plant, morphological changes of great variety and magnitude can be brought about in a comparatively short space of time. This appears to me to have a very important bearing on the rate of evolution. Mr. Darwin quotes Lord Kelvin as insisting "that the world at a very early period was subjected to more rapid and violent changes in its physical condition than those now occurring" ; and he adds, "Such changes would have tended to induce changes at a corresponding rate in the organisms which then existed" ("Origin," sixth ed., p. 286). That changes may be effected with considerable rapidity cannot, I think, be denied.

(2) It is further, I think, abundantly proved in the present case that, though sudden variations do occur, they are, as far as we know, slight as long as self-fertilisation is adhered to. The striking results obtained by cultivators have been due to the patient accumulation by selection of gradual but continuous variation in any desired direction.

(3) The size which any variable organ can reach does not appear to be governed by any principle of correlation. Large flowers are not necessarily accompanied by large leaves. Under natural conditions size is controlled by mechanical limitations and by the principle of economy. Nature cannot afford to indulge in anything unnecessary for the purpose in view (see Darwin, "Origin," 6th ed., p. 117).

(4) The general tendency of a plant varying freely under artificial conditions seems to be atavistic, *i.e.* to shed adaptive modifications which have ceased to be useful, and either to revert to a more generalised type or to reproduce "characters which are already present in other members of the same group" (see Darwin, "Origin," 6th ed., p. 127). This conclusion must, however, be accepted with caution, for we must remember that in a case like the present we are only acquainted with variations which have been preserved with a particular end in view.

(5) The case of "cresting" shows that the plant still possesses the power to strike out a new line and to develop characters which would even be regarded as having specific value, as in the total change which has been effected in the form of the leaf in *Primula sinensis*. If such a race developed any degree of sterility with other races, it would have satisfied Huxley's criterion for the artificial production of a new species.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—The Savilian Professorship of Geometry being vacant by the death of the late Prof. Sylvester, the Electors will proceed to the appointment of a successor in the course of the present Term. The duties of the Professor are defined in the following provisions of the Statutes :—"The Savilian

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[1] For a general discussion of the principles of variation and specific stability, see NATURE, vol. li. pp. 459-461.

Professor of Geometry shall lecture and give instruction in pure and analytical geometry. The Professor shall reside within the University during six months, at least, in each academical year, between the first day of September and the ensuing first day of July. He shall give not less than forty-two lectures in the course of the academical year; six at least of such lectures shall be given in each of the three University Terms, and in two at least of the University Terms he shall lecture during seven weeks not less than twice a week." The emoluments of the Professorship as determined by Statute are as follows:—"He shall be entitled to the emoluments now assigned to the Professorship and derived from the benefaction of Sir Henry Savile, Knight, or from the University Chest; and shall receive in addition the emoluments appropriated to the Professorship by the Statutes of New College." The total amount of these emoluments is 900*l.* a year, and cannot exceed that amount. Applications, together with such papers as a candidate may desire to submit to the Electors, must be sent to the Registrar of the University, Clarendon Building, Oxford, on or *before* June 12, 1897.

All examinations within the University will be suspended on June 22.

Prof. Gotch, F.R.S., has been elected a Delegate for the extension of teaching beyond the limits of the University.

Mr. W. Garstang, Fellow of Lincoln College, will give a public lecture in the hall of Lincoln College on May 25, on "Recent Researches in Marine Biology."

The Botanical Museum of the Department of Botany has been undergoing rearrangement under the supervision of Mr. Church. The work is now nearly completed. Some 4000 new specimens have been added to the Herbarium during the past year.

The Curators of the Botanic Garden have presented their ninth Annual Report to Convocation. It is satisfactory to note that the deficit of last year has been considerably reduced, and a great number of exchanges with other Gardens have been made.

At a meeting of the Junior Scientific Club, held on Friday, May 14, papers were read by Messrs. E. S. Goodrich and E. F. Morris. A proposal to amalgamate with the Ashmolean Society fell through, the Club not being in a condition to bear the somewhat heavy financial burden which would be consequent on amalgamation.

An examination for the Shute Scholarship in Animal Morphology (a Non-Collegiate scholarship) is announced. It will take place in July 1897, the scholarship being of the annual value of 50*l.* Candidates must be in need of assistance at the University. The scholarship is open to all, without limit of age, with the exception of members of the University of more than eight terms' standing. Names are to be sent to the Censor of Non-Collegiate Students, High Street, Oxford, on or before Monday, June 14.

CAMBRIDGE.—The Committee for promoting the admission of women to titular degrees appears to be disintegrating. On May 17 a fly-sheet was circulated by the President of Queens' (Dr. Ryle), the Registrary (Mr. J. W. Clark), Mr. E. S. Roberts (tutor of Caius), and Mr. W. L. Mollison (tutor of Clare), expressing their decision to withdraw their support from the proposals before the Senate. They are now convinced the removal of the alleged grievance, felt by a comparatively small number of women, would be bought at too high a price, when considerably more than half of the resident members of the Senate are bitterly opposed to the measure, and would view it, if carried, as a grave betrayal of trust. They express the opinion that a victory under such conditions would be worse than a defeat, and that the passing of the Graces would prove injurious to the best interests of the University. They hope that before long a solution will be found in which the Universities of Oxford and Cambridge may act together. There is good reason to believe that the views which these influential members of the Senate have had the courage publicly to express, are shared by others who are still, nominally, on the side of the women, and that these will now either abstain from voting, or follow the lead now given to them by giving their voice against the much-discussed resolutions. The result will be declared soon after 3 p.m. on Friday afternoon, and, in the interests of peace, it is hoped that the majority will be decisive. A narrow victory for either side would settle nothing. A London Committee of about one hundred members has been formed to secure the rejection of the Graces, and is actively engaged in disseminating information and securing promises to vote *non-placet*. Lord Kelvin is chairman, and Dr. E. Freshfield secretary; among the other members are the Astronomer Royal, the Registrar of the Royal College of Physicians, Dr. Norman Moore, Lord Stanmore, and Sir Walter Besant.

Mr. W. N. Shaw, F.R.S., has been reappointed a University Lecturer in Experimental Physics.

Applications for leave to occupy the University Tables in the Zoological Stations at Naples and Plymouth are to be sent to Prof. Newton, F.R.S., Magdalene College, by May 26.

THE President of the Board of Agriculture has appointed a Departmental Committee to inquire into the working of the Universities and College Estates Acts, 1858 to 1880, and to report whether any, and, if so, what, amendments therein are desirable.

IT is perhaps worthy of notice that a new Board school, erected in Faraday Street, Walworth, at a cost of 15,000*l.*, has been named the Michael Faraday School, in honour of Faraday, who was born in the parish. May the children who receive instruction in the school strive to follow the example set them by the great investigator whose name the school bears.

THE International Submarine Telegraph Memorial Committee has granted "The Sir John Pender Gold Medal," value 5*l.* 5*s.*, to the Glasgow and West of Scotland Technical College. It is given annually to the best student who at the same time obtains the college diploma in electrical engineering. At the end of this session, which terminated last week, it was awarded to Mr. David Robertson.

Science announces the following gifts to educational institutions in America:—The will of the late John Foster, of Boston, gives 120,000 dols. to public purposes, including 10,000 dols. to the Massachusetts Institute of Technology; the will of the late Charles Bell, of Springfield, Mass., bequeaths 7000 dols. to Wellesley College for a scholarship fund; Brown University receives 10,000 dols. by the settlement of the will of the late Mrs. Maria L. Benedict, of Providence.

IN the House of Commons, on Monday, Mr. Brynmor Jones asked the First Lord of the Treasury whether it was the intention of the Government to reintroduce the University of London Bill this Session; and, if so, when. In reply to the question, Mr. Balfour said that the President of the Council hoped to introduce a Bill into the House of Lords shortly. There is some reason to expect that the difficulties, which prevented it from passing last year, will be removed, and certain negotiations are going on with that object.

THE following are among recent appointments:—Mr. C. H. Warren to be Instructor in Mineralogy in the Sheffield Scientific School of Yale University; Dr. Karl Paal to be Professor of Chemistry at Erlangen; Dr. Raphael Freiherr von Erlanger, privat-docent in Zoology at Heidelberg, to be Professor; Dr. F. Foerster, privat-docent in Chemistry at the Dresden Technical High School, to be Professor; Dr. Petzold, privat-docent in Practical Geometry at the Technical High School at Hanover, to be Professor; Dr. Anding, privat-docent in Astronomy at Munich, to be Observer on the International Commission for the Measurement of the Earth; Dr. J. Thomayer to be Professor of Pathology at the Bohemian University at Prague; Mr. J. F. Crawford to be Demonstrator in Experimental Psychology in Princeton University.

IN October last a Committee was appointed "to inquire into the mode in which the grants to Science and Art Schools are distributed, and to report whether any alteration should be made therein." The Report of this Committee has just been published as a Blue-book, in which is also included a revised edition of the Science and Art Directory, embodying the recommendations of the Committee. Some of the important changes advocated are as follows:—(1) "In counties and county boroughs in England possessing an organisation for the promotion of secondary education, the authority so constituted may notify its willingness to be responsible for the science and art instruction within its area." This recognition of local authorities as those who should be responsible for secondary instruction will, the Committee thinks, simplify the work of central administration, secure greater efficiency in the schools, and be a protection against this undue competition and multiplication,

(2) To encourage the study of languages and literary and economic subjects, and to meet the objection that the Science and Art grants tend to promote a one-sided education, it is proposed that any *bonâ fide* student attending an evening science or art class shall be able to earn a grant by attendance at University Extension courses of lectures. It is expected that the grants made on this account will only absorb an infinitesimal proportion of the total grants disbursed by the Department of Science and Art. (3) Hitherto certain restrictions as to income have existed which precluded some students from earning grants or winning scholarships. These are to be abolished; but, to prevent abuse, a regulation has been added that schools in receipt of payment must be "approved by the Department as suitable in character and financial position to receive aid from public funds," and with reference to persons eligible to hold certain scholarships and exhibitions, a provision has been added that "the Department may refuse to fill them with persons whose circumstances do not appear to warrant such aid." (4) It is suggested that the Honours examination in each subject should be divided into two parts, one less advanced in character than the other.

LORD HERSCHELL, the Chancellor of the University of London, took the opportunity of referring to the need of a teaching University, at the meeting held on Wednesday in last week for the distribution of medals and certificates. A University was not worthy of the name, he is reported by the *Times* to have said, unless it inspired a love of knowledge for its own sake. It was this conception of the mission of a University which made him desire to introduce a different element into their University, so that it should no longer be the main object of its members to obtain degrees; and if, even as regarded a minority of students, the function of teaching were added to that of examining, the idea of a University would be realised in a far higher degree than it was at present. The question of a change in their constitution had been before the country for many years, and he would not approach it in a controversial spirit, but he could not but express a hope that some step would soon be taken. The discussions of the last two years had removed many misconceptions between those who held widely different views from each other; and the progress of consideration and the interchange of views might, he thought, lead to approximation between those who appeared to stand asunder. But he was inclined to think that the questions at issue might better be solved by an independent body than by mutual concessions on the part of opposing parties. The danger of compromise was that each side might concede something which ought not to be conceded—a danger which an independent body might avoid. The main objection urged against change was that it might tend to lower the quality of degrees. If that were likely to be the result, he should be the enemy of change; but he did not believe it passed the wit of man to devise means whereby the University should become a teaching body and yet both maintain its present high standard and safeguard the interests of external students. Certainly those members of the Senate who were favourable to change were the last men who would wish to lower the degree standard. But he wished to point to a real danger. There could be nothing more fatal to the prestige and influence of their University than that there should arise by its side another University in London which should teach as well as examine; and if the choice lay between such a second University and the modification of the existing University of London, surely the latter alternative was preferable. The feeling in favour of a teaching University was so strong that in one form or another it must succeed in its aim, and surely it was wiser to look facts in the face than blindly to oppose the inevitable march of events.

SOCIETIES AND ACADEMIES.

LONDON.

Physical Society, May 14.—Mr. Shelford Bidwell, President, in the chair.—Mr. W. Watson described an instrument for comparing thermometers with a standard. The thermometers to be compared are inserted together in an enclosed vapour-tube, the temperature of which can be maintained very constant at different parts of the scale. The apparatus is an adaptation of the arrangement designed by Ramsay and Young for vapour densities. It consists of a wide vertical glass tube, with a narrower tube attached at the top. The narrow tube bends downwards, and communicates with a closed vessel of considerable volume. A portion of the vertical tube is surrounded by a condensing-jacket, and a manometer-tube is inserted near the top. The object of the large vessel is to diminish errors arising from fortuitous changes of pressure, resulting from small leakages or "bumping" of the boiling liquid. Electrical heating of the bulb containing the liquid, effectually removes the "bumping." The following liquids, used consecutively, give a range of temperature from 20° C. to 120° C.: carbon bisulphide (20° to 46°), ethyl alcohol (80°), chlorobenzine (120°). The apparatus when once started required very little attention; from results submitted by the author, the variations do not exceed 0·02° C. per hour. In constructing the various parts, the difficulties of glass-blowing are reduced by making the joints of india-rubber stoppers, attached to the glass with india-rubber solution. Each joint is jacketed with glycerine. If the above liquids are used in the vaporiser, the scales of the thermometer can always be read within the tube; it is only with water that the condensed vapour gives trouble. Prof. Ayrton thought the apparatus would come into extensive use; it did away with errors arising from differences of length of thermometer stems; it left no question as to the equality of temperature of the two bulbs; and there was no probability of error due to a difference of thermal "lag" in any two thermometers. Mr. Watson, in replying to a question of Prof. Perry's, said the fact of using india-rubber joints limited the available range of temperature. Working with blown joints, Ramsay and Young had found no difficulty with their vapour-density experiments at higher temperatures.—Prof. Carey Foster read a paper, by Mr. D. K. Morris, of Zürich, on the effect of temperature upon the magnetic and electric properties of iron. The investigation relates to the measurement of the magnetic permeability, hysteresis, and electrical resistance of iron, simultaneously, at different temperatures. The specimens are formed into annular rings, made from iron strip. The strip is first lapped round with asbestos paper and mica, and then wound upon itself to the required thickness. A platinum wire is included in the mica lappings, for thermometrical purposes. Upon each annular ring are the following windings: (1) a primary magnetising coil; (2) a secondary coil connected to a ballistic galvanometer; (3) an electrical heating coil. Further, the iron strip is itself connected to a Wheatstone's bridge, for resistance measurements. The coil can be heated to 1050° C. At the higher temperatures, the surrounding air has to be freed from oxygen; this is done by enclosing the coil in a suitable vessel, and exhausting with an air-pump. When most of the air has thus been removed, the residual oxygen is absorbed by an electrically-heated iron wire. Curves are drawn representing the changes of permeability at the different temperatures; and, at the same temperatures, the corresponding hysteresis loops are plotted. The hysteresis diminishes with temperature; it nearly vanishes at about 764° C. At the suggestion of Prof. Ayrton, it was agreed that the discussion on this paper should be adjourned until the publication of the results. The paper will, therefore, be printed without delay.—Mr. Rollo Appleyard read a paper on the formation of mercury films by an electrical process. If a sheet of damp leather, or similar permeable substance, is used as a separating diaphragm between two bodies of mercury, and a current is sent through it, a film of mercury is deposited upon the surface connected to the positive pole; and the film remains on the diaphragm after removal from the apparatus. If the diaphragm is replaced in the apparatus, and subjected to a current in the reverse direction, the film vanishes from that surface, and a second film appears on the other side; that is to say, the film is always on the side of the diaphragm connected to the positive pole of the battery, and there is no film on the negative surface. Different diaphragms and films were exhibited on filter-paper, asbestos-paper, plaster of Paris, &c. A current of about one-fiftieth of an ampère, or more, is necessary. A sheet of tinfoil included between folds of filter-paper becomes perforated with pin-holes when the current is passed between the outside surfaces. This happens whether the outside electrodes are mercury or metal plates. If the top electrode should be tinfoil, this also becomes perforated as well as the included sheet. A further experiment was shown in which a gold coin is placed upon the folds of filter-paper; the current produces a gold-discoloration which penetrates the folds. This, it was suggested by the author, may help to account for the formation of metallic lodes and veins as they exist in rocks;